

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

I. Choose the best answer : (30%, 2% for each, no deduction on wrong answer)

1. Which one is the "Prefix" form of the string $[A*B/C+D/E-F*G]$ in "Infix" ? (A) $-+/*ABC/DEFG$,
(B) $+/*ABC/DE*FG$, (C) $*-+/ABC/DE*FG$, (D) $*+*/ABC/DEFG$.
2. Which one is the fastest in the computer? (A) Cache memory, (B) Main memory, (C) Flash memory,
(D) Processor register.
3. Which layer support routing and congestion control? (A) Link Layer, (B) Network Layer, (C) Transport Layer,
(D) Application Layer.
4. What data structure is best suited for converting an infix expression into a postfix expression? (A) Stack,
(B) Queue, (C) Binary search tree, (D) Hash table.
5. Which one is **not** the feature of connection-oriented service in TCP/IP ? (A) Less overhead, (B) Ensure
high availability, (C) three-way handshake before connection, (D) Reliable data transfer.
6. Which one is **not** the key concept in dynamic programming? (A) Recurrence relation, (B) Tabular computation,
(C) Recursive tree, (D) Traceback.
7. How much data can be downloaded in the 4G LTE with 100M bandwidth in one minute theoretically?
(A) 600 Mbytes, (B) 480 Mbytes, (C) 6 Gbytes, (D) 0.75 Gbytes.
8. Which one of the following technologies is the most similar to the operation of proxy servers?
(A) virtual memory, (B) time-sharing, (C) cache memory, (D) pipeline.
9. Which one is **not** the feature of object-oriented language? (A) Encapsulation, (B) Inheritance, (C) Link list,
(D) Polymorphism.
10. Which of the following method is not applied in "Black-box testing" ? (A) Exhaustive testing,
(B) Control structure testing, (C) Random testing, (D) Boundary-value testing.
11. What is the minimum depth of a tree with 1043 nodes? (A) 7, (B) 9, (C) 10, (D) 11.
12. What is the max number in IEEE 754 single precision?
(A) 0 11111111 111111111111111111111111, (B) 1 11111111 111111111111111111111111,
(C) 0 11111110 111111111111111111111111, (D) 1 11111110 111111111111111111111111.
13. Which phase costs most in the software lifecycle? (A) Requirement analysis, (B) Object-oriented design,
(C) System programming, (D) System maintenance.

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14. Which one is not a hand-held device OS ? (A) Windows 10, (B) Android, (C) iOS, (D) Blackberry.

15. Consider the following C program, what value will the variable 'i' be ? (A) 4, (B) 5, (C) 6, (D) 8.

```
int x = 1;
int i = 1;
while(x <= 1000)
{
    x = 2^x;
    i = i + 1;
}
```

II、Short-answer questions : (70%)

1. Please briefly explain the following terminologies. <20%>

- (A) UML,
- (B) Certificate Authority (CA),
- (C) CMMI,
- (D) Vehicle Ad Hoc Network (VANET),
- (E) Von Neumann Bottleneck.

2. What is "dynamic programming" ? What kinds of problems can be solved by "dynamic programming"? <10%>

3. Convert each of the following values.

- a. Convert 0.00875_{10} to IEEE 754 single precision format. <5%>
- b. Convert -0.0234375_{10} to IEEE 754 single precision format. <5%>

4. List and explain the five layers of internet communication protocol <10%>

5. What are the four elements needed to defined a procedure (or function) ? <10 %>

6. List the pre-order, in-order, and post-order sequence of the following binary tree. <10 %>

